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PROVINCE OF ONTARIO

DEPARTMENT OF LANDS AND FORESTS

Division of Fish and Wildlife

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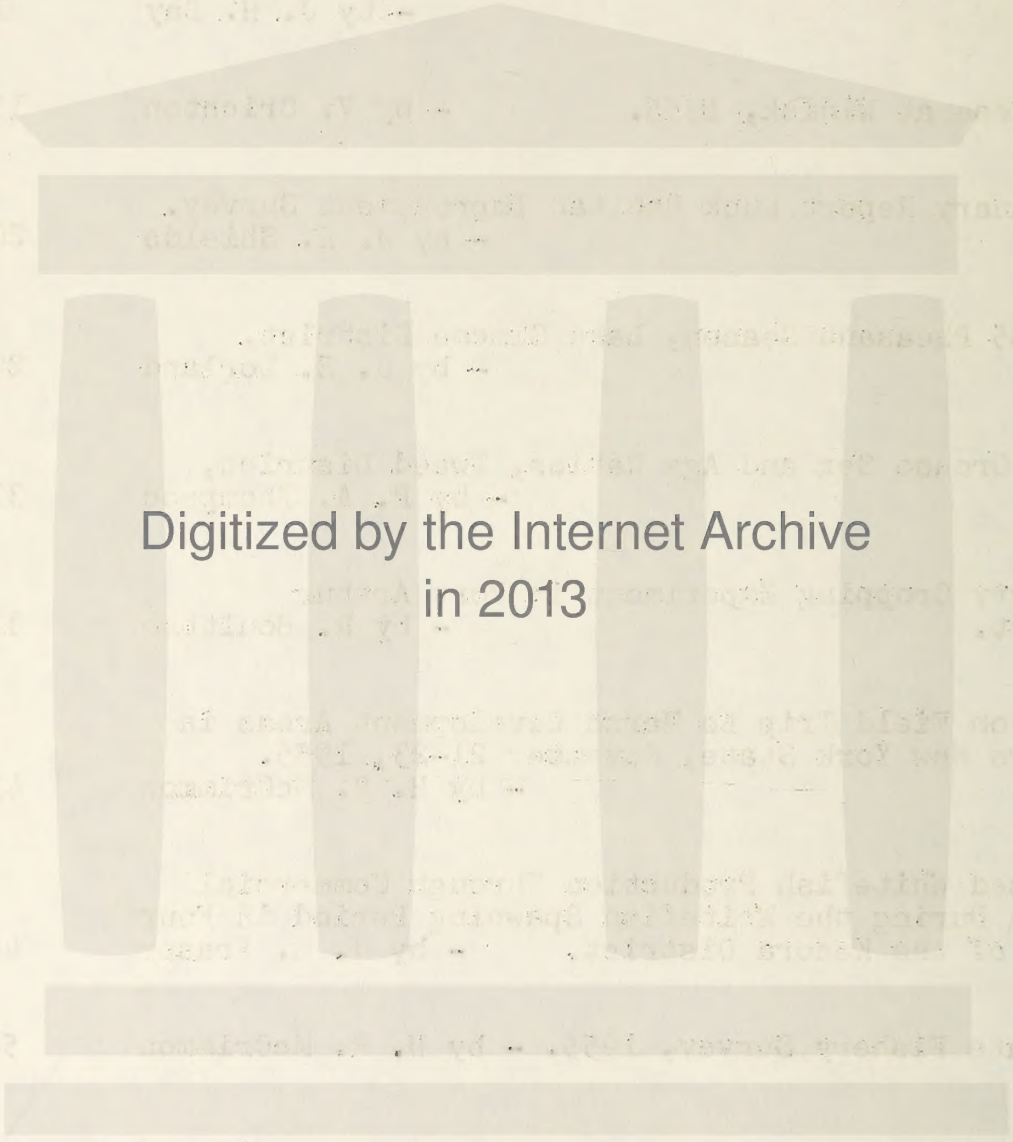

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AN INVESTIGATION OF LUTHER MARSH, ONTARIO

by
J. H. Day
Canadian Wildlife Service

Introduction

The Luther Marsh, located approximately 17 miles west of Orangeville, Ontario, was established in its present form in 1952 under the direction of the Grand Valley Authority. The marsh, more correctly termed a swamp, is made up of farm land and forest which was inundated when a dam was constructed across the main outlet leading to the Grand River. The entire development was the result of action by communities affected by the flood conditions prevailing along the Grand River system during certain times of the year. The dam controls water flowing into the Grand River and ultimately into Belwood Lake to the south. A second dam controls the outflow at the south end of Belwood Lake. The water above the first dam, in the Luther Marsh, is usually retained at its maximum level after the spring runoff until the water in Belwood Lake can be controlled easily by the dam there. In 1954 the water level of the marsh was lowered two feet from the maximum, on May 24. It was expected that in 1955 it would be lowered to the same extent early in July, a delay caused by a very wet spring.

Besides functioning chiefly as a flood control area and providing a constant water source for areas along the Grand Valley, the Luther Marsh has two other very desirable features: it raises the water table, which was lowered after the area was drained for agricultural purposes; and it provides suitable habitat for the many forms of wildlife normally associated with wet lands.

Purpose

The purposes of the study were to obtain a general picture of waterfowl production on the Luther Marsh, to evaluate the area as a duck habitat by examining the food and cover plants growing there, and to study vertebrate forms associated with the resident waterfowl population.

Methods of Study

Study began June 12, 1955, and was terminated June 22.

Local residents were questioned regarding past conditions on the marsh, hunting pressure, species present in the autumn, areas of heaviest duck and hunter concentrations

during the hunting season, and other matters connected with the resident waterfowl population. William Flynn conservation officer with the Ontario Department of Lands and Forests, was also interviewed with regard to the waterfowl situation on the marsh.

The shore area was investigated on foot, and the islands and certain locations within the marsh were reached for study in a boat rented for the purpose.

All species of waterfowl present were noted, but territorial ducks were especially considered. There was not sufficient time to make a nest survey or a brood census, but it was believed that an accurate conception of the production of certain species of waterfowl, particularly blue-winged teal (Anas discors) could be obtained by noting territorial pairs. Since other species such as black ducks and mallards had generally completed nesting before the study took place, their numbers and production could not be determined accurately.

Extent and Description of the Luther Marsh

The Luther Marsh, which covers about ten square miles, varies considerably in character. In the north, south and west parts it is mainly inundated forest land. Elm, (Ulmus sp.) Black ash, (Fraximus nigra) Poplar, (Populus sp.) white cedar, (Thuja occidentalis) and Tamarack (Larix sp.) are the main species represented. Most of these trees are dead but in local areas holding comparatively little water, some are living. Bordering the swamp and also in many of the open areas within the forest willows (Salix sp.) grow abundantly. The east part is mostly open fields with only dispersed wooded areas and the adjacent water is relatively open. The field cover is mainly grasses such as canary grass (Phalaris sp.), timothy (Phleum sp.), and blue grass (Poa sp.), which grow with other plants such as goldenrod (Solidago sp.) and milkweed (Asclepias sp.).

Within the marsh are five islands; some of these were sub-divided by high water at the time of the study making a total of nine.

There were abandoned farm houses on four islands and all but one had been actively farmed at one time. Typical abandoned farm situations existed, and orchards of apple (Pyrus sp.) and plum and cherry (Prunus sp.) trees. Field conditions somewhat like those found along the eastern section of the marsh were also in evidence on the islands.

The land leading down to the marsh along the west, south and north sides is very similar in character to that found in the eastern part and on the islands, except that it lies adjacent to thick swamp.

Around the islands and along the east shore of the marsh, a belt of cattail about 20 to 30 feet in width followed the shore line about 15 to 20 yards out from it. This was apparently the usual summer water line.

Past History

The marsh was at one time a swamp much like it is now. At one time it was drained for agricultural purposes and for many years, prior to 1952, the only water areas were two boggy lakes approximately three miles apart. Within the extensive swamp and between the two lakes a creek meandered south and eastward. This stream, which collected the runoff from the surrounding areas, apparently became quite torrential and swollen in the early spring.

Local residents state that the forest of the region has been cut over about four times. The original trees apparently were for the most part hemlock (Tsuga sp.) and pine (Pinus sp.). Succeeding growth was chiefly poplar, birch (Betula sp.), elm, tamarack, and white cedar. At the time of the flooding in 1952, most of the trees were immature and except for occasional elms, were generally of pole size.

The resident wild duck population up to 1952 was mainly found in the two lakes but some birds nested along the creek. The species present according to the local residents were restricted to the "big ducks" which must have included black ducks (Anas rubripes) and mallards (Anas platyrhynchos). The main producing area was apparently in the region of the old lake (see Map).

Results

For the purposes of the study the marsh was divided into five areas. The observations in these areas are described in the following sections.

West Area

This portion of the marsh is about four miles in length. Gently sloping fields lead down to the water. The fields had been cultivated at one time and in some instances were being grazed at the time of the investigation, chiefly by beef cattle. The effects of grazing along this shore tended to be local and did not appear to have a serious effect on nesting. The swamp, which begins about 30 yards from the water's edge, was mainly composed of poplar, birch, tamarack, and cedar. There was some black ash in the northern portion.

Cattail (Typha sp.) grew throughout the area between the shore and the swamp border, along with sedges (Carex spp.), rushes (Juncus sp.), spike-rush (Eleocharis sp.), water

smartweed (Polygonum amphibium), and horsetail (Equisetum sp.). There were only few truly submerged aquatics. Bladderwort (Utricularia sp.) and water stargrass (Heteranthera dubia) was present in minimal amounts. On the submerged road beds leading into the marsh were heavy growths of coontail (Ceratophyllum sp.). Throughout the entire area, especially in the sheltered recesses, duckweed (Lemna spp.) grew in abundance.

An old creek bed was located about 400 yards from the swamp margin and ran parallel with the shoreline. In it were large patches of sago pondweed (Potamogeton pectinatus), coontail, cattail, and leather-leaf (Chamaedaphne calyculata). Small patches of white water-lilies (Nymphaea sp.) were dispersed throughout.

On the land bordering the swamp were many of the grass species interspersed with certain members of the family Compositae. Immediately adjacent to the shoreline in a few places were small hardwood lots, the major species of which were beech and maple.

Black ducks and mallards were seen frequently just within the swamp but their status as breeding birds could not be determined accurately. Two mallard broods and two black duck broods were observed on one trip which covered about a mile of this area, but the actual numbers of birds in the individual broods could not be determined because of the dense nature of the vegetation there. It was believed that many broods escaped detection as they swam into the thick swamp. Production of mallards and black ducks in this area may be presumed high, judging from the ideal nesting locations on the adjacent land.

Many breeding pairs of blue-winged teal occupied the area along its west side. Territorial pairs and males identified themselves by their reluctance to leave. When disturbed, they usually swam away and soon returned to their territories. It was estimated on the basis of a census taken along the entire east area that the concentration of nesting teal was about one pair per 200 yards of shoreline or about 40 nesting pairs occupying the entire west area. The density of territorial pairs was higher where the shoreline was not obstructed by thick vegetation.

Along the old creek bed about the cattail islets three ring-necked ducks (Nyroca collaris) were observed (two females and one male). On another day one pair of ring-necks was observed in the area. It is possible that this species nested in the vicinity, most likely on the cattail islets, many of which presented ideal locations.

South Area

This area was characterized by swampy conditions, especially throughout its western portion. The trees present were poplar, tamarack, hemlock, birch, and cedar. Along with the other emergents, water arum (Calla palustris) grew in the dense swamp. In the eastern portion, the marsh still retained bog-like characteristics prevalent before flooding, and leather-leaf predominated there. However, the bordering vegetation in this area was similar to that found in the other areas, the main species being poplar and willow.

South of the south area, Wylde Lake, the more southerly of the two lakes mentioned previously, was located. It had all the characteristics of a bog lake. However, the water within this lake was not connected with the water in the swamp but was, in fact, separated from the Luther Marsh by dry land approximately 300 yards in width. Wylde Lake, which is about 300 yards in diameter, was rather broken up by islands of encroaching sphagnum (Sphagnum sp.). Leather-leaf, pitcher-plant (Sarracenia sp.), alder (Alnus sp.), birch, spruce and tamarack grew in association with the sphagnum. Within the lake itself the emergent vegetation was mainly water-shield (Brasenia schreberi) and occasionally there were patches of spatter dock (Nuphar advens). No true submerged aquatics were recognized growing in the very darkly-stained water.

The entire area, particularly along the bordering fields, presented some good nesting locations for both mallard and black ducks. Although no accurate estimation of production was possible, it was believed that production of these two species here was high. However, boggy parts in the southern portion did not have good nesting habitat and so the east and west parts may be believed to be the heaviest producing areas.

Blue-winged teal tended to be concentrated in the northern part of the area, which apparently contained preferred nesting habitat. The total number of breeding pairs was estimated to be about 20.

Eight green-winged teal, all drakes, were noted with a pair of mallards, occupying one of the potholes formed by peat dredging in the southern boggy part of the area. No other species was observed in the immediate vicinity.

East Area

Open fields, containing few trees ran down to the edge of the water in this area. Some of the area was intensely farmed and some heavily grazed. These practices,

since they were confined, appeared to have little effect on duck production which was evidently very high. As mentioned before, field situations prevailed here and the various grasses along with wild strawberry (Fragaria sp.), vetch (Vicia sp.), bladder campion (Silene cucubalis), sweet clover (Melilotus sp.), thistle (Cirsium sp.), daisy (Chrysanthemum sp.), and buttercup (Ranunculus sp.), were represented. In many cases the fields were bordered by raspberry (Rubus sp.) and red osier dogwood (Cornus stolonifera) hedges.

The emergent vegetation close to the water's edge was also various and included cattail, which bordered the shoreline. Between the cattail and the shoreline, and in some cases beyond the cattail, arrow-leaf (Sagittaris sp.), manna-grass (Glyceria sp.), rush, spikerush, blue flag (Iris versicolor), dock (Rumex sp.), sedges, water smartweed, and duckweed (Lemna spp.) were the predominant emergents. Bladderwort was evenly distributed, and sago pondweed, the other major submergent, was found in patches. Coontail was also found occasionally and water buttercup grew in the more sheltered areas.

Black ducks and mallards were seen occasionally as they flushed from locations along the shore. Most of these species appeared to be using the area for loafing. Of the 33 noted only six were paired. In one case, 22 mallard drakes and two black ducks were observed in one flock. Two black duck broods were observed, one containing four class 1A young and the other six class 1B young. Again the estimate of mallard and black duck production on the marsh was not possible for the species had completed nesting for the most part and the females had evidently taken their broods to the dense swamp in other parts of the marsh. The abundance of drakes suggested, however, that many females were with broods. It is believed that mallard and black duck production in this area was high, judging from the character of the habitat.

The presence of territorial blue-winged teal in some places as concentrated as one pair per 50 yards of shoreline, suggested very high production of these ducks along the east shore. It was estimated that the concentration of adult pairs throughout the area was about one pair per 150 yards of shoreline or approximately 50 pairs in the four miles of shoreline.

In certain local areas the concentration of territorial birds was high. For example, in a flooded corner about three-quarters of an acre, of an 80-acre field, there were two pairs of teal, one pair of shovellers, and a pair of pintails. All these exhibited pronounced territorial behaviour.

Pintails (Anas acuta) were occasionally seen along the east section of the marsh and four pairs were observed holding territories. One brood of eight class 1B young was observed as they moved out into the open water from the cattail.

Six green-winged teal (Anas carolinense) drakes and one territorial pair were observed. Although no nests or broods of this species were seen, it is believed that green-winged teal nest on the marsh.

Three shoveller drakes (Anas clypeata) and one pair were observed along the east side of the marsh. In two cases these birds were identified as being on territory.

Three lesser scaup ducks (Nyroca affinis) were seen out on the water about 400 yards from shore. This species gave no indication of nesting.

North Area

This area, which is very irregular in shoreline development, is for the most part heavily forested. The trees were generally composed of the species mentioned previously, the most abundant being poplar. There were, however, some pure stands of elm. Spruce was present in patches and there were occasional patches of dogwood. Willow grew in the more open areas and about the periphery of the swamp.

The feature most characteristic of this area was the tendency of the wooded portion to begin at the edge of the water. Herbaceous material found growing in the open areas were generally similar in nature to those found in the other parts of the marsh and included sedges, dock, and blue flag.

Not all of the northern part of the swamp was accessible to investigation and so the entire area was not visited. In the part investigated it appeared that, although only a minimal quantity of teal was being produced, black duck and mallard production was probably comparable to that of other areas of the marsh. The denseness of the vegetation in this area precluded any accurate analysis of production.

The Islands

The islands within the marsh had previously been farmed, and four of the nine islands had abandoned farm houses and barns on them. Near the abandoned buildings there were in all cases small orchards, usually composed of apple trees, In one case plum trees were present also. The grass about the orchards was usually thick and presented ideal nesting locations.

Around each island there was a strip of cattail about five yards wide growing about ten yards from the shore. In some places the cattail was particularly extensive. Outside of the cattail, was the usual swamp stand comprised of willow, poplar, birch, white cedar, and tamarack. Elm, red maple, Manitoba maple (Acer Negundo), cherry (Prunus sp.) and an occasional spruce or basswood tree, along with red osier dogwood, sumac (Rhus sp.), and raspberry bushes were woody plants found on almost all the islands.

Herbaceous vegetation and what may be considered as nesting cover plants found on the drier parts of the islands included, timothy, reed canary grass, wild strawberry, vetch, sweet clover, dock, and some members of the Compositae, such as goldenrod and daisy. Emergent vegetation growing in the water out from the edge included rush (Juncus sp.), bulrush, blue flag, sedges, spike-rush, water smartweed, pondweed (Potomogeton sp.), dock, and cattail. The submerged aquatics were mainly sago pondweed, water stargrass, coontail, and water buttercup.

Flocks of mallard and black duck drakes were frequently flushed from loafing areas along the shore of the islands, but only two pairs were observed. One mallard nest and one nest believed to be that of a black duck was seen, which contained three and 15 eggs, respectively. In the former, the clutch was evidently only partly completed, and in the latter incubation was evidently well advanced. Two eggs had, in fact, been hatched, but the young were not seen - the female duck was not on the nest when it was found. No broods of these species were seen.

Pintails were seen on two islands. On one island, the most northerly, there were two territorial pairs and five pairs apparently not territorial. A nest containing six eggs was found on another island. One gadwall (Anas strepera) nest containing 12 eggs was uncovered in the same region. Five ruddy ducks, (Oxyura jamaicensis), two pairs and one drake, and a single redhead (Aythya americana) drake were observed just outside of the cattail bordering the islands. Their presence suggested nesting of these species in the marsh.

A section of the marsh about one square mile in extent, which is called the "huckleberry marsh" by local residents, takes up the area between and slightly northwest of the three central islands. This section was entered by boat but, due to the nature of the thick growth of leather-leaf, only a very small part was visited. Black ducks and mallards flushed singly, in pairs, and in groups as the boat was pushed into the section. Fifty black ducks and mallards were observed during the short trip. It is claimed by local residents that this section produces many "big ducks" which, they say, nest on the dry

patches of leather-leaf. This is believed possible and warrants further investigation. It is also very likely that the ducks nesting along the periphery of the marsh bring their broods to this region after hatching.

Predation

None of the seven nests examined showed any signs of predation. However, nest predators such as raccoons (Procyon lotor), skunk (Mephitis mephitis), crows and red fox (Vulpes fulva), were known to be present.

The footprints of raccoons were seen in the mud along shore and their scats on the rocks and logs close to the water. Examination of four scats revealed that crayfish (Cambarus sp.) was the major food item, although the remains of a young bird was found in one and portions of mallard egg shells in another. A more thorough search for nests would probably reveal some nest predation by these animals.

Skunk tracks were occasionally seen and a road kill was found near the marsh. Skunk odour was noticed twice. Although skunks are known to be predators on duck nests, it is believed that their numbers in the marsh are presently so low that they do not exert much influence on nesting.

Red foxes were observed on two occasions near their dens located along the east shore. It was interesting to note that the areas close to the dens were generally devoid of territorial teal. This may have been coincidence.

Crows, abundant in the wooded area along the west and north shores of the marsh, were absent on the islands and only rarely seen along the east shore. Predation by these birds during the nesting season of 1955 was, it appears, low.

Snapping turtles (Chelydra serpentina) are known to be present on the marsh. Various sight accounts of these turtles were given by residents, and areas dug up by egg laying females were occasionally seen. The large size of the marsh must minimize their effects as predators on young ducks.

Predation on the islands was limited. The only predator known to be a resident there was the raccoon. Skunks and red foxes appeared to be restricted to the mainland. Crows, although quite capable of flying to the islands, were not seen there during the period of the study.

Other Vertebrates

Fishes

The fish life in the region appears to be generally restricted to the coarse forms. Killifish (Fundulus sp.) and stickleback were especially abundant in the shallow areas. These fish were preyed heavily upon by grebes (Podilymbus podiceps) and black terns (Chlidonias niger). Local residents report catching "chub", "suckers", and occasional "bass" from the dam. Apparently none of the large predacious fishes were present and fortunately, no carp. According to residents there was a heavy winter kill of fish during the winter of 1954-55.

Amphibians

Leopard frogs (Rana pipiens) were everywhere. The tadpoles of these species, at that time in the process of developing legs, were present in incredible numbers throughout all the shallow areas. Green frogs (Rana clamitans) were also observed but in lesser numbers. Although no bullfrogs (Rana catesbiana) were seen, one was thought to have been heard.

Reptiles

Garter snakes (Thamnophis sp.) were occasionally seen. Although no other snake species was observed it was the practice of one local resident to carry a stick to kill "rattlers" every time he made a sortie into the swamp.

Birds

Birds of most species were abundant and most forms typical of marsh and swamps were represented.

A common loon (Gavia immer) was found dead on the open water near the dam and was given to the Ontario Museum for preservation.

Pied-billed grebes were very abundant on the marsh and their broods were often observed.

Great blue herons (Ardea herodias), black-crowned night herons (Nycticorax nycticorax), eastern green herons (Butorides virescens), and American bitterns (Botaurus lentiginosus) were often seen. The nesting area for the first two species was found in the swamp.

One ruffed grouse (Bonasa umbellus) was the only representative of the order Galliformes seen in the area. It was observed as it crossed a road just east of the marsh.

Coots (Fulica americana) were everywhere. Production of these birds in the Luther Marsh is very high. One pair of sora rails (Porzana carolina) were observed in the south area of the marsh and it was believed that they had a nest there. One Florida gallinule (Gallinula chloropus) was seen at the edge of the cattail in the east area of the marsh.

Spotted sandpipers (Actitis macularia) were occasionally seen when disturbed from the margin of the marsh.

Gulls (Larus sp.) were frequently seen resting on the open parts of the marsh and flying over it. Black terns were very abundant.

Mourning doves (Zenaidura macroura) were occasionally observed as they flushed, usually in pairs, from the edge of the marsh or from the fields close by.

One marsh hawk (Circus hudsonius) was seen as it flew over the swamp. This was the only bird of prey observed on the marsh.

Of the order Passeriformes, crows (Corvus brachyrhynchos) and common redwings (Agelaius phoeniceus) were the most conspicuous. Many others were observed, however, including the bobolink (Dolichonyx oryzivorus) which frequented the fields about the swamp.

Mammals

Deer (Odocoileus virginianus) were seen on only two occasions but their numerous tracks about the periphery indicated abundance. Along with the skunks; raccoons and red foxes; mink (Mustela vison) were known to be present but none were observed. Jack rabbits (Lepus europaeus) were seen on four occasions in the fields close to the marsh. Ground hogs (Marmota monax) and cottontail rabbits (Sylvilagus sp.) were also seen occasionally.

Muskrats (Ondatra zibethica) are trapped in the swamps and a few houses constructed by this species were observed.

Summary and Conclusions

The Luther Marsh was established in its present form in 1952. During the period of study, June 13 to 22, 1955, the water level within the marsh was at a maximum

but it was anticipated that it would be lowered two feet by early July.

The flooded area is essentially swampy. The trees are mainly poplar, birch, elm, white cedar, tamarack, hemlock, and black ash. Most of them are dead.

Two areas, one to the northwest and the other to the south, are largely made up of flooded land growing leather-leaf. The eastern part of the marsh is open.

On the land bordering the flooded area and on the islands were fields with a cover, in the drier portions, of various kinds of grasses, along with wild strawberry, thistle, daisy, milkweed, sweet clover, vetch, and bladder campion. The woody plants growing in the same area included red maple, Manitoba maple, hard maple, sumac, cherry, apple, wild plum, elm, spruce, and poplar. Woody shrubs present were red osier dogwood, raspberry and currant.

Along the shore of the swamp cattail, spikerush, bulrush, dock, water smartweed, pondweed, blue flag, manna grass, arrow leaf, water arum, horsetail and white waterlily grew as emergents. Submerged species included bladderwort, coontail, water buttercup, sago pondweed, and water star grass.

Black duck and mallard nesting was almost completed and the broods of these species were confined generally to the dense swamp. Territorial blue-winged teal were counted and an estimated 160 nesting pairs occupied the marsh. Teal evidently preferred the areas adjacent to the open fields for territorial sites. Pintail and gadwall were also noted as nesting species. Other species of ducks suspected to be nesting in the area were: green-winged teal, ruddy ducks, and ring-necked ducks. Lesser scaup ducks and red-heads were also seen on the marsh.

The area presents ideal nesting habitat for the above species and the present practice of lowering the water level in the summer is very favourable for the development of emergents. Ideally the area should be allowed to assume its early summer level in the autumn so that the waterfowl may take advantage of these plants.

Recommendations

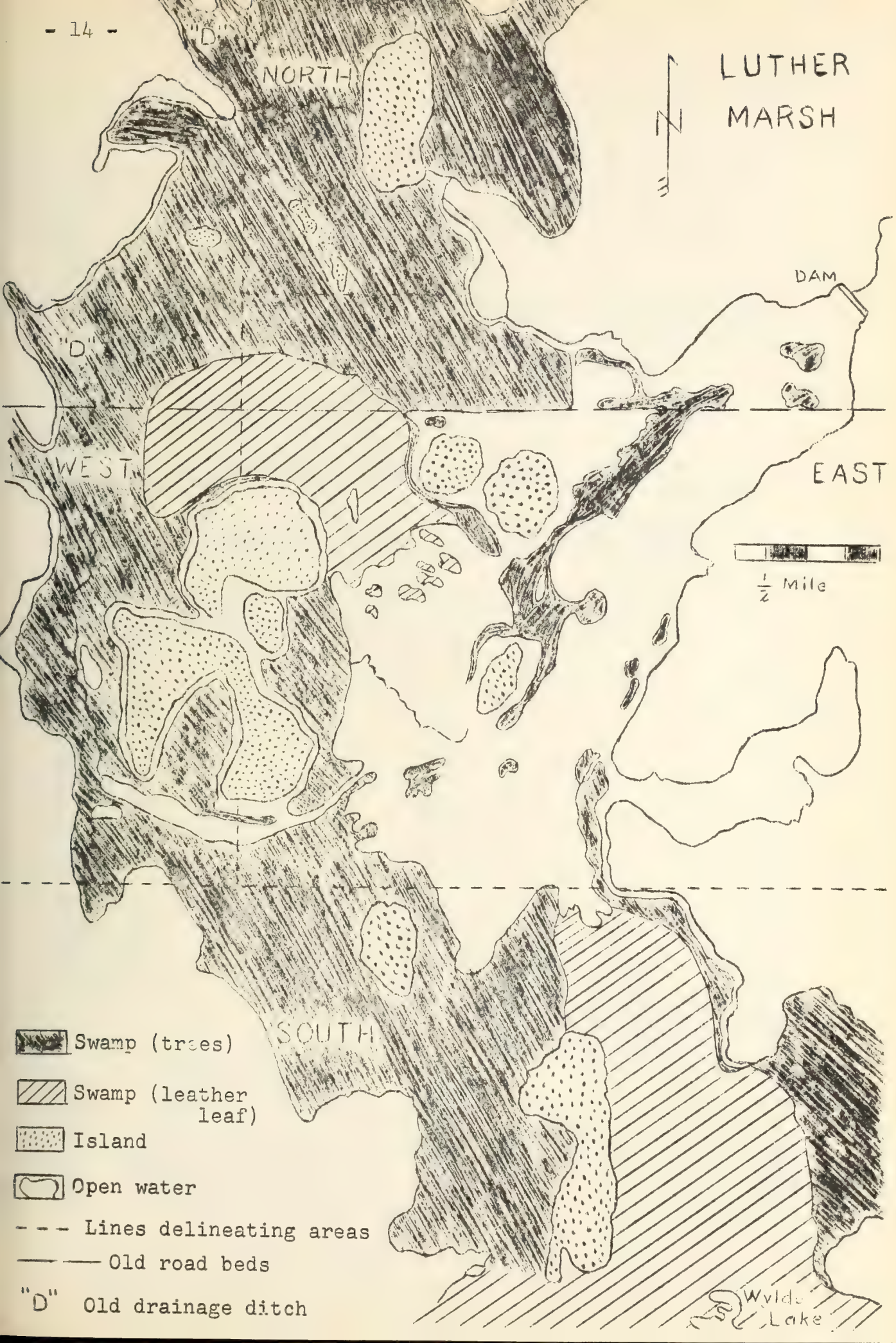
It is recommended that maximum water levels be maintained until July 1. Lowering the water level at an earlier date and thus establishing the shoreline within the swamp proper would considerable reduce blue-winged teal territorial sites, particularly along the west side of the marsh.

The decay of trees felled in the swamp may lead to acid conditions but the fluctuating water levels and the steady flow of water out of the marsh should tend to reduce the effect. It may, however, be found worth while to remove some of the fallen trees. This would not only tend to reduce the acidity but also allow the development of aquatic plants. It may be well to remember, however, that any procedure which would tend to make the marsh more accessible to hunters should be undertaken with caution.

Certain aquatics useful as duck food and cover may be successfully planted in the marsh. Since sago pondweed is doing very well in many areas, further plantings in the remote areas should certainly add to food productions in the marsh. Water smartweed may also be propagated. Giant bur-reed, a good cover and food plant, may be successfully introduced. Wild rice, too, may do very well in much of the area from the islands eastward to the dam. Certainly this species would be much superior to cattail, the species most likely to develop there. It should be remembered, however, that wild rice is only useful as a food and cover species for a limited period of time in the early autumn.

Grazing on lands adjacent to the marsh should be controlled. Rotation of grazing could, however, be useful in maintaining nesting areas, particularly for blue-winged teal, by holding back succession. It is suspected that the blue-winged teal production is at a maximum now and will decline as succession proceeds.

Since production of black ducks, mallards, and teal is evidently very high in the area of the Luther Marsh, a more intensive study of its waterfowl production should be of great interest and value. The banding of ducks produced in the marsh should provide much information on migratory patterns and mortality along the flyway of locally raised birds.


LUTHER
MARSH
N
"D"
NORTH
DAM
"D"
WEST
EAST
½ Mile
SOUTH
Swamp (trees)
Swamp (leather leaf)
Island
Open water
- - - Lines delineating areas
—— —— Old road beds
"D" Old drainage ditch
Wyldes Lake

SNOW GEESE AT WINISK, 1955.

by
V. Crichton

The following is a summary of observations made on the ratio of Snow Geese to Blue Geese at Winisk on days when conditions were such that definite observations could be made, between September 5th and October 23rd, 1955.

Except where stated otherwise as approximate, the numbers quoted are actual.

Attached also are daily weather conditions which apply to the dates on which observations were made.

Due to the absence of a proper thermometer, the minimum and maximum temperatures could not be recorded.

Observations Made on Ratio of Snows to Blues and of Adults to Young.

		Snows	Blues
Sept. 5		16	2
Sept. 6	Approx. 6500	90%	10%
Sept. 6		12	1
Sept. 9		59	5
Sept. 12		55	5
Sept. 15		26	4
Sept. 16		24	2
Sept. 22		18	nil
Sept. 25		20	2
Sept. 26	(small flocks)	60	50
Sept. 27		30	70
Sept. 30		150	50
Oct. 5		150 (80% young geese)	nil
		150 (50% young geese)	nil
		8 (7 adults, 1 young)	nil
		7 (2 adults, 5 young)	nil
		nil (2 adults, 7 young)	9
	Approx. 100	50%	50%
Oct. 6	Approx. 300	50%	50%
Oct. 8	Approx. 200	50%	50%
Oct. 9		16	nil
Oct. 14	Approx. 3000	70%	30%
Oct. 21	Approx. 450	60%	40%
Oct. 23	Approx. 1300	70%	30%

Weather Conditions

Sept. 5	Strong north wind. Cold, overcast with many rain showers.
Sept. 6	Strong north wind. Overcast and cold with rain showers.
Sept. 9	Very strong south wind. Overcast and warm with rain in p.m.
Sept. 12	Strong cold north wind. Overcast with rain and snow.
Sept. 15	Northeast wind. Calm, clear and warm.
Sept. 16	Moderate east wind. Overcast with rain most of the day.
Sept. 22	East wind. Calm, overcast and warm.
Sept. 25	Strong west wind. Clear and cool.
Sept. 26	Moderate west wind. Light overcast and warm.
Sept. 27	Strong southwest wind. Overcast with light rain.
Sept. 30	Moderate west wind. Partly cloudy with snow flurries.
Oct. 5	Strong east wind. Clear and cool.
Oct. 6	Southeast wind. Overcast with rain most of day.
Oct. 8	Strong west wind. Warm with rain in a.m. Overcast.
Oct. 9	Strong west wind. Clear and warm.
Oct. 14	South wind. Calm, cloudy and warm.
Oct. 21	West to east wind. Calm, mild, overcast with snow flurries.
Oct. 23	Strong very cold north wind. Overcast with heavy frost during night.

Patchy Geese in the hunters bags amounted to forty-seven (47) of which one was identified as a female Richardson's Goose killed on Sept. 5th.

On Sept. 5th an adult Bald Eagle was observed at Winisk.

On October 4th, two (2) adult Whistling Swans were noted in a hunter's bag, but the sex could not be determined as the entrails had been removed.

Geese of any species were not seen in the vicinity of Winisk after October 23rd with the exception of seven (7) Canada Geese observed on the Winisk River on October 31st.

Indian residents of Winisk remarked that there were not as many Blue and Snow Geese at Winisk this year as last (1954) but the number of young Snow and Blue Geese was very much greater than last year. They also remarked that there seemed to be more patchy geese than previously.

The following is a summary of part of the kill of Blue and Snow Geese at Winisk between September 5th and October 20th, 1955. Five hundred and fifty-one (551) geese were examined of which three hundred and ten (310) were Snow Geese and two hundred and forty-one (241) were Blue Geese.

Four hundred and eight (408) were classified as to adults and young of the year and were sexed. One hundred and forty-three (143) were classified as to adults and young of the year but were not sexed as the entrails had been withdrawn prior to examination.

A record of weather conditions for the days on which geese were killed is also attached. Due to the lack of a proper thermometer the minimum and maximum temperatures could not be recorded.

Many geese had been killed prior to August 21st. Fort Severn Indians were camped on the islands and along the coast. They took considerable geese in August and early September. However, due to lack of transportation it was impossible to assess and classify the kill. On three dates, September 16th, 20th and October 8th, the kill was classified from two hunters' bags. It is significant to note that one hunter's bag contained few males, while the other hunter's bag contained few females. The significance of this did not register with the observer until it was too late to collect more detailed and pertinent facts relative to the same.

Geese Sexed and Aged

Date	Snows				Blues			
	Adults		Young		Adults		Young	
	Male	Female	Male	Female	Male	Female	Male	Female
Sept. 5	1							
Sept. 7		13	4	2	1	2		
Sept. 10		1						
Sept. 11		1						
Sept. 12		2	1	1				1
Sept. 13	1	2	4					1
Sept. 14			2					
Sept. 15	11	7	3	3	1	4	8	2
Sept. 16	7	5	2	1	4	2	2	3
Sept. 19	16	17	5	2	8	13	7	6
Sept. 20	10	12	3	2	6	8	4	4
Sept. 24		1	2	1				2
Sept. 27	3	5	3	5	4	4	11	5
Oct. 1			1					2
Oct. 8	7	10	6	7	4	7	8	7
Oct. 9	1				1			2
Oct. 10			2	1			1	3
Oct. 11		1	3	3	1	2	2	1
Oct. 12		2	2	1	1		1	
Oct. 18		1					1	2
Oct. 19	6	2	1	3	3	3	3	
Oct. 20	2	4		1	2	1		2
Totals	72	86	44	33	36	46	48	43

Geese Aged Only as to Adults and Young of the Year

Date	Snows		Blues	
	Adults	Young	Adults	Young
Oct. 14	10	2	9	8
Oct. 25	8	19	9	22
Nov. 11	11	15	9	11
Total	29	36	27	41

The geese aged on October 25th were an accumulation of geese killed a few days prior to October 23rd.

The geese aged on November 11th were killed some time previously, presumable in October and were hung up on the coast as the geese were all gone prior to October 24th.

Description of Weather on Days Kills Were Assessed

Sept. 5	Strong cold north wind. Overcast with many rain showers.
Sept. 7	Strong cold north wind. Overcast with rain showers.
Sept. 10	Strong cold west wind. Overcast with rain and hail showers.
Sept. 11	Strong cold north wind. Overcast with rain and snow.
Sept. 12	Strong cold north wind. Overcast with rain and snow.
Sept. 13	Strong west wind. Mostly cloudy and fairly warm. Heavy frost.
Sept. 14	Strong north wind. Overcast and cool.
Sept. 15	Northeast wind. Calm, clear and warm.
Sept. 16	Moderate East wind. Overcast with rain most of day.
Sept. 19	Strong east wind. Overcast and cool.
Sept. 20	Strong north wind. Overcast and cold with snow flurries.
Sept. 24	Strong northeast wind. Overcast and cool.
Sept. 27	Strong southwest wind. Overcast with light rain.
Oct. 1	Very strong west wind. Overcast and cool.
Oct. 4	West wind. Calm, mostly cloudy and warm.
Oct. 8	Strong west wind. Warm with rain in a.m.
Oct. 9	Strong west wind. Clear and warm.
Oct. 10	Strong west wind. Cloudy, cool with rain showers.
Oct. 11	Strong east wind. Cloudy and cool.
Oct. 12	Very strong southeast wind. Mostly clear and warm.
Oct. 18	Moderate northwind. Overcast and cold with some light rain.
Oct. 19	West wind. Overcast and calm. Cool with rain and snow showers.
Oct. 20	Strong west wind. Overcast and cold with heavy snow flurries.

SUMMARY: Snow Geese in Hunters' Bags at Winisk, 1955.

Colour ratio of snow geese at Winisk 310 white:241 blue
= 129 white:100 blue

Adult sex ratio	white	72: 86♀ = 84:100
	blue	36: 46♀ = 78:100
	Total	108:132♀ = 82:100
Juvenile sex ratio	white	44: 33♀ = 133:100
	blue	48: 43♀ = 112:100
Age ratio	white	113:197 ad. = 57:100
	blue	132:109 ad. = 121:100
	Total	245:306 ad. = 80:100

44% young

PRELIMINARY REPORT

DUCK HABITAT IMPROVEMENT SURVEY

by
Mr. J. K. Shields
Department of Botany
University of Toronto

(Note - This survey was made in cooperation with the West Toronto Fish and Game Protective Association. This group has been interested in the lakes south of Lake Nipissing through Parry Sound and Muskoka with the idea of improving the habitat for waterfowl and to assist ducks on their migratory routes. Mr. Shields carried out the investigation in 1953.)

Three Mile Lake

A considerable portion, some 60%, of the lake margin is rocky particularly along the northern and southern sides. Exceptions are in the shallow coves with silty to fine sandy bottoms found particularly in the eastern side of and scattered along the southern shore. The large north bay of the lake has about half of the shoreline rocky and wooded.

The abundant shallows found in the eastern half of the lake have a silty to fine sandy bottom providing suitable growing conditions for many aquatics. The lake as a whole is well stocked with aquatic vegetation much of which is suitable as duck food and cover. A few locations along the shore are limiting for plant growth because of the rocky or gravelly nature of the bottom.

Main pioneering species are Water Milfoil, Myriophyllum tenellum, Creeping Spike Rush and Water Horsetail which are more suited to the harder-packed sand. Pickerelweed and Pipewort are both common in shallow water.

Floating Pondweed, Wild Celery, White Water Lily and Water Shield are found in good numbers in many parts of the lake. Richardson's Pondweed is common in the east end of the lake in deeper water but was only in the vegetative state at that time.

The shallows on the northeast side not only provide excellent available food plants but have good cover along the shore provided by Cattail, Spikerush, and Swamp Loosestrife. Wild Rice planted nearby has prospered in the

mucky bottom and should be able to survive, although possibly not in as great numbers as would provide available grains to both feed ducks and initiate new seedling growth the following year. Duck Potato is also plentiful in this region. There was, however, evidence of cattle browsing along sections in this part of the lake which resulted in damage to several Wild Rice Plants.

The creek flowing into the southeast corner of the lake offers some fine cover along its length and contains ample Celery-leaved Pondweed and Yellow Cow Lily; Wild Rice could possibly do better here along the margins of the creek where the drop in the bottom is not too steep. Duckweeds could also be introduced in this and the other creeks, mostly in the sunnier and quieter waters.

In general, Wild Celery is found in promising numbers in the eastern half of the lake. There are possibly many spots where Sago Pondweed and also Bushy Pondweed could be planted as valuable additions in preference to Wild Rice.

Skeleton Lake

Some 70% of the shoreline is rocky in this spring-fed lake but sandy shallows exist in many coves along the southern and eastern shores.

The predominant aquatics are Pipewort and to a lesser extent Water Lobelia, Water Milfoil is also quite abundant in the sandy shallows.

One of the better situations in regard to vegetation is located in a shallow stream flowing into a small cove on the southwestern shore of the lake. Aquatics here include Variable Pondweed, Chara, some Wild Celery and some Duck Potato, the latter along the edge of the stream. Water Shield and Yellow Cow Lily were represented by good stands in the cove. This area is not suited to Wild Rice plants, however, Bushy or Sago Pondweeds could be tried.

Along the rocky north shore one location seems to be more suited to aquatics than others in this district. This is the cove at the northwestern end of the lake. The shallow creek flowing into this cove is of a brownish colour and has a peaty layer over the coarse sandy to gravelly bottom. Only a few plants were found upstream and they consisted of Callitriche, Yellow Cow Lily and Duck Potato. Near the mouth of the creek however, good colonies of aquatics are established and include Floating Bur Reed, Celery-leaved Pondweed, Water Milfoil and Yellow Cow Lily. To the west of the creek delta is a good stand of Carex rostrata and Spike Rush in shallow water. This region is

not too favorable for Wild Rice introduction because of the sandy nature of the bottom. The Sago Pondweed or Wild Celery would be better choices to introduce to this cove.

In general, aquatic species are not too abundant in the lake due to the cold waters, the sandy or coarse sandy nature of the bottom and the steep tree-littered bottoms along portions of the lake's margin.

Axe Lake

The lake itself is a deeply stained brown colour with a medium sandy to coarse sandy and gravelly bottom covered by a peaty layer. Floating aquatics in the shallow southern half of the lake are White Water Lily, Water Shield and Yellow Pond Lily. These aquatics are very numerous in this portion of the lake and also enter into Beaver Creek at the southwestern end. Celery-leaved Pondweed is abundant in the creek and is found in the eastern bay.

Excellent wildfowl cover is found in the boggy sedge-sphagnum meadow which supports abundant cranberries and blueberries besides the sedges. A log dam some distance up the creek is a factor in controlling the water level. At the time of the survey, the lowlevel of the lake resulted in many aquatics becoming stranded. There were no traces of Wild Rice plantings in either Beaver Creek or the lake, and it is possible that conditions of the water, the soil bottom and the water level fluctuations were detrimental to the development of the seedlings.

The northern half of the lake is considerably deeper and is bordered by a shallower fringe where Water Lilies, Water Shield, Pondweed and Pipewort grow.

This lake has much in the way of both aquatics and bog vegetation to supply food and cover to a considerable number of ducks. If further aquatics are to be introduced, Duckweeds might be brought into Beaver Creek.

Buck Lake

In this lake there is a considerable portion of the shoreline which is sandy, with extensive shallows in the southern western and northern ends. Most of the shoreline is comprised of silty to fine sand with a few gravelly to rocky margins.

The shallows at the southern end support good stands of White Water Lily, Yellow Pond Lily, Water Shield and Pipewort. Milfoil, Water Lobelia and Rushes are established at various points near and along the southern beach.

The creek flowing into the southeastern corner of the lake has a considerable marshy area due to a log dam used as a cattle crossing. There are good stands of Cattail, Willows, Rushes and Horsetails in this marshy area. In the creek are found White Water Lily, Yellow Pond Lily and Duck Potato. Wild Rice plantings are not recommended here because of the water fluctuations and evident cattle browsing.

Beaver Creek entering into the southwestern corner of Buck Lake supports good numbers of Yellow Pond Lily, White Water Lily, Floating Bur Reed and Floating and Celery-leaved Pondweeds. Small sedge meadows in the woods near the creek contain besides sedges, some rushes and stranded Yellow Pond Lilies. Wild Rice plantings in 1952 around the bay into which Beaver Creek enters showed negative results. The sandy to coarse sandy nature of the bottom is not a suitable substrate for the development of Wild Rice seedlings. Conditions along the edge of the creek should be more favorable to plantings of Wild Rice because of the mucky nature of the bottom. Duckweeds could also be tried in the creek. Sago Pondweed would be better to introduce in the delta region of the cove.

Bartlett Lake

This is a rather shallow lake with a silty to fine sandy bottom that tends to be mucky near the south shore. In this region there is a good stand of aquatic rushes, reeds and bulrushes. Duck Potato is present along the mucky shore and a good colony of Twig Rush is found in the muck and shallow water.

Other prominent aquatics are the Floating Knotweed, White Water Lily, Floating Bur Reed, Wild Celery, a little Floating Heart and some Celery-leaved Pondweed. Milfoil, Pipewort and Water Lobelia are common throughout all of the lake.

The north bay has mostly a sandy bottom and supports Pipewort, Pond Lily, Water Lily, Floating Bur Reed and Creeping Spike Rush.

Few locations in the lake seem to be suited for Wild Rice introductions. Sago and perhaps Bushy Pondweeds would be better aquatics to bring in.

Sollman Lake

This is a spring-fed lake which is relatively poor in regard to duck food vegetation. The lake bottom is sandy to coarse sandy and rocky. Over 90% of the shore line is rocky.

The commonest species are Pipewort which is widespread in all shallow parts of the lake and Water Lobelia which is scattered along the shore in shallow water.

Floating heart, Water Shield, Cow Lily and Pickerelweed were well established. Floating Bur Reed, Cattail and Rush were growing in a few patches.

No suitable locations were observed in which to plant Wild Rice. Duckweeds could be planted in the stream at the northeastern end above the dam. Wild Celery and Sago Pondweed could be introduced although these species may not spread as rapidly as desired due to the sterile soils and the cold waters.

Machar Lake

This lake has mostly a fine to coarse sandy bottom although there are mucky areas along the edges of some coves on the western and southwestern shores and some small clay patches scattered along the northernshore. The shoreline is about half rocky and half sandy.

Shallow sandy coves support such pioneer plants as Creeping Spikerush, Pipewort, Water Lobelia and the Milfoil, Myriophyllum tenellum. There is a little Vallisneria and Variable Pondweed in the deeper waters of the lake.

Along the edge of the bay on the southwestern side of the lake, Pipewort, Water Lily, Pond Lily, Water Lobelia, Rush and Floating Pondweed constitute the main vegetation. Several aquatics were stranded along the sandy beaches as a result of the low water level. The shallow creek flowing into this southwestern bay has a coarse sandy to gravelly bottom with occasional mucky margins supporting abundant Duck Potato and Pickerelweed. There seems to be no suitable spots along this stream for Wild Rice introductions.

Along the marshy edge of the north beach are Manna Grass, and Spikerush. Aquatics consist mainly of Pipewort, Water Lobelia, Pond Lily and Milfoil. Nearer the west side of the northern portion of the lake are several clay patches. These occur outside a stand of Pickerelweed and could support Sago Pondweed, Wild Celery and possibly some Wild Rice.

The bays on the west side are mostly sandy with some gravelly mixtures. Horsetail and Water Lily are abundant here. Floating Pondweed and Bladderwort are also in fair numbers. Wild Celery plantings could be tried here.

Beatty Lake

This is a fairly shallow lake with a predominantly sandy shoreline along the northern margin and a mostly rocky southern margin. Although there are no coves of notable size, the fine to medium sandy and occasionally mucky bottom supports much aquatic vegetation. There are a few clay patches along the northeastern shore.

Pipewort and Water Lobelia are the most abundant species in the shallows along all of the shoreline, while Pickerelweed and Cattail are found in scattered localities. The coves along the south side contain mostly Horsetail, Spikerush and Milfoil. The eastern shallows have mostly Great Bulrush over much of the fine sandy bottom besides abundant Pipewort and Milfoil. In the deeper waters, up to three feet, on the eastern side are found scattered plants of Bushy Pondweed.

The northern shore is only rocky at points on the east and west sides, the rest being a sandy beach. Pipewort is abundant in from one to four feet of water, while Creeping Spike Rush and Pickerelweed occur in patches. Floating Pondweed and large-leaved Pondweed are common in deeper water of from four to six feet along this northern shore.

On the western side of the lake there is a large Water Shield colony with much Water Lily, Pipewort and Horsetail. Pond Lily, some Cattail, Wild Celery and Celery-leaved Pondweed were also observed on this side of the lake.

Suitable locations for introduction of Sago Pondweed and more Wild Celery exist in both the northwestern and the eastern ends of the lake. In the northwestern cove suitable clay or mucky bottoms should be able to support Wild Rice plantings.

Gerber Lake at the western end of Beatty Lake contains much in the way of aquatics. These include Celery-leaved, Large-leaved and Floating Pondweeds, Water Lily, Pond Lily, Pipewort, Pickerelweed and Water Lobelia. Both these lakes have ample aquatic vegetation suitable for duck food and a certain amount of cover.

McQuaby Lake

Most of the shoreline of this spring-fed lake is rocky and wooded, there being only a few sandy beaches at the northeastern end. Pipewort and Water Lobelia are the commonest species seen in the lake growing in shallows with a coarse sandy to gravelly bottom. These two species are not in abundant numbers. Sunken trees at many locations lining the shore hinder the growth of vegetation.

On the northeastern side there is some Pickerel weed and a little Twig Rush growing in the shallows. On the south shore there is a small patch of sterile Cattail. Long coves on the southern shore are deep and mostly rock lined. One cove on the southwestern end of the lake contains very little Floating Bur Reed in four to five feet of water, some Pond Lilies and Water Lilies and a few sterile plants of Water Shield. Few of these aquatics had any flowers. In the northwestern cove there are some patches of Rush (Juncus militaris) in from one to two feet of water along the shore. Pipewort and Water Lily were the only aquatics of note here.

It is doubtful if further plantings would increase the aquatic vegetation since the present species are not very aggressive in their small colonies.

Ruth Lake

This lake for the most part has a wooded and rocky shore, the marshy areas being confined to the long northeastern bay.

Vegetation in the northeastern bay is very abundant and consists of Creeping Spikerush, Pickerelweed and Water Lily near and in the creek. Also abundant are Water Shield and Pond Lily, Milfoil, Sedge, Bulrush, Duck Potato and Small Bladderwort. Pipewort covers a considerable portion of the bottom in the shallows, while Pickerelweed is very thick further up the shallow creek. On the eastern side of the bay near the entrance of the creek are good stands of Cattail and Carex rostrata, a sedge growing in a mucky bottom. Floating Bur Reed and Celery-leaved Pondweed are found in good quantities near the mouth of the creek. Wild Celery and Sago Pondweed could be introduced here where competition from the weedy Pipewort would not be too great. Cattle grazing is evident among the Cattail and Pickerelweed on the east side but there are suitable spots for Wild Rice on the west side of the bay near the creek entrance.

At the northwestern side of the large southern bay is a shallow sandy point. Near here is a good stand of Celery-leaved and some large-leaved Pondweeds. Rush, Sedge and Pipewort are also in good numbers here.

Along the southern shore of the lake near the western end, the shore line is quite sandy and wooded. The sandy bottom has a sudden drop a few feet from the shore margin but supports a large stand of Horsetail. Pipewort and two species of linear-leaved pondweeds were well distributed here. Also present in this district were many colonies of Spongilla, a fresh water sponge.

The northwestern cove of the big western bay has a shallow bottom covered with wood chips brought down by a creek from an old lumber mill. Yellow Pond Lily, Floating Bur Reed, Callitriche and Large Bladderwort are well represented here. Conditions here do not seem favorable for further plantings although Duckweeds might be introduced into the creek flowing into the cove.

Summary of Aquatic and Marsh Vegetation

In all some 326 species and varieties were recorded for the ten lakes surveyed.

Lake	Number of Species
Three Mile	60
Buck	42
Axe	38
Machar (Eagle)	36
Bartlett	33
Beatty (Wolfe)	31
Ruth	31
Skeleton	29
Sollman (Horn)	15
McQuaby	11

Aquatic and marsh vegetation in respect to number of species and abundance may be classified as very good in Three Mile, Axe and Beatty Lakes, good in Buck, Bartlett, Machar and Ruth Lakes and poor in Skeleton, Sollman and McQuaby Lakes.

Suggestions for Plantings

Wild Rice seems to thrive best in locations where there is a slight current of water supplying oxygen to submerged leaves and roots of young plants. This condition is more often found in slow-moving streams and in the delta regions near the entrance of streams. Wild Rice seems to require a good amount of sunlight in order to grow at its best. For this reason, creeks that are too shaded by trees would have an unfavorable growth in the cold water. Wild Rice prefers a soft bottom in which to become established where there would be little competition from weedy aquatic plants. Wild Rice seems to grow best in water about 1 - 2 feet deep. Seasonal water level fluctuations would be disastrous to Wild Rice planting if the regions to be planted were to be a muddy or dry beach in late summer. Plantings are not advised if the lake bottom is of a well-packed sandy nature.

Wild Celery plantings may be made in deeper water from 2 - 4 feet deep. Soil bottom should not be of a too coarse sandy or gravelly nature. Finer sands or silt bottoms are preferred. Three Mile Lake is the best available source of Wild Celery in this district.

Duckweeds do best on the surface of calm ponds and streams that receive a good supply of sunlight. They are inclined to become too weedy as is the case in the Holland River but they should not be too obnoxious in colder and partially shaded waters.

Sago Pondweed requires some of the conditions of Wild Celery but will grow in shallower water of from 1 - 2 feet, while Bushy Pondweed will grow in from 1 - 6 feet of water.

THE 1955 PHEASANT SEASON,

LAKE SIMCOE DISTRICT

by
J. S. Dorland

In connection with hunters' success, a survey was made during the open season for pheasants to determine number of pheasants seen and shot by hunters in certain regulated townships of Lake Simcoe District.

This work was carried out by Conservation Officers, Deputy Game Wardens and some of the office staff.

A total of 487 hunters were checked with a total of 723 hunting hours. These hunters saw 348 cock pheasants, 544 hens and shot 125 cocks. The 487 hunters consisted of 177 separate parties of which 74 used some type of dog.

The County of Peel and the Townships of Adjala, Tecumseth and West Gwillimbury enjoyed a seven-day shoot while the remainder of the regulated townships had two days. The townships which held a seven-day shoot show the hunters were spread out more and had better success than those having the two-day period.

No reports were available from East and North Gwillimbury, East Whitby, Toronto or Adjala Townships where hunting intensity and pheasant population was low. The following table shows the results of the survey during the hunt in the Regulated areas.

Pheasant Hunters' Success

Township	No. Checked	No. Hunting Hours	No. Cocks Seen	No. Hens Seen	No. Cocks Shot	Parties Using Dogs	Birds Per Man Hours	Birds Per Hunter
(York)								
Vaughan	39	53	14	11	5		.09	.13
King	86	103	28	73	13	8	.13	.15
Markham	206	341	181	330	57	46	.16	.27
Whitchurch	48	87	38	42	22		.25	.46
E. Gwillimbury	No report							
N. Gwillimbury	No report							
TOTAL	379	584	216	456	97	54	.17	.26
(Ontario)								
E. Whitby	No report							
Whitby	14	16	7	3	2	2	.12	.14
Pickering	34	26	24	46	4	6	.28	.12
TOTAL	48	42	31	49	6	8	.14	.14
(Peel)								
Toronto	No report							
Toronto Gore	No report							
Chinguacousy	29	37	27	12	15	6	.16	.51
Caledon	20	26	12	11	3	4	.12	.15
Albion	2	8	2	6	2	1	.25	1.
TOTAL	51	71	41	29	20	11	.28	.4
(Simcoe)								
Adjala	No report							
Tecumseth	7	23	5	4	1	1	.04	.14
W. Gwillimbury	2	3	10	6	1		.03	.5
TOTAL	9	26	15	10	2	1	.08	.22
GRAND TOTAL	487	723	348	544	125	74		.25

RUFFED GROUSE SEX AND AGE RATIOS, TWEED DISTRICT, 1955

by
P. A. Thompson

During the 1955 Grouse season a number of wings and tails from Ruffed Grouse were collected.

For comparison the following table gives the sex and age ratios of Grouse taken during the 1954 and 1955 seasons.

Year	Adult ♂	Adult ♀	Juvenile ♂	Juvenile ♀	Total	Sex Ratio ♂ to ♀	Age Ratio Juv.-Adult ♀
1954	9	3	7	10	29	123:100	5.6 : 1
1955	7	5	10	19	41	71:100	5.8 : 1

BLUEBERRY CROPPING EXPERIMENT IN PORT ARTHUR DISTRICT

by
R. Boultbee

Several fires attributed to blueberry pickers occurred in Port Arthur District in the three or four year period preceding 1950. A suggestion was made that blueberry pickers should be concentrated on selected areas where crops would be improved by periodic controlled burning. In January 1950 the Chief of the Division of Forest Protection requested the investigation described herein, to discover if periodic burning would produce heavier blueberry crops. Improved Forest Protection was therefore the object of the experiment.

The experiment covered five growing seasons from 1951 to 1955. It was located on a large open sand plain near Nipigon, Ontario. The area had been cut for jackpine and burned ten or twelve years before the experiment. Fire was employed again at the beginning of the experiment and the following main conclusions were clearly brought out by the Fall of 1955:

1). Blueberry plants pruned by fire can produce a heavier crop of berries. The crop can be two or three times larger than normal in the fourth year after burning treatment.

2). Adverse weather conditions override the effect of treatment by fire. Drought or frost reduce treated and untreated areas to a low crop level.

3). During the experiment only one good growing year occurred. The other four growing seasons nullified the effects of treatment and resulted in poor crops.

4). An expectancy of only one good crop in five years rules out controlled burning of open sand plains in Port Arthur District as a Forest Protection measure.

The foregoing paragraphs give all the information the experiment was required to produce, and the most essential information in dealing with problems of blueberry management. However a great deal of interesting information came out of the experiment and is recorded below under appropriate headings.

GENERAL DISCUSSION

The experiment consisted of three layouts each comprising three plots one hundred feet square. In each layout one plot was burned in the Fall, one in the Spring, and the remaining plot (the centre one) was used as a control. The three layouts were well separated from each other (greatest distance $2\frac{1}{2}$ miles. The burning treatment of plots 1, 3, 4 and 6 was severe to destructive. The burning of plots 7 and 9 was light. The tally

of blueberries was made from fifty quadrats one foot square on each plot. Quadrat dimensions were estimated by eye.

Table 1 shows the average number of blueberries per quadrat, by plots following burning treatment. The tally for plots 2 and 5 in 1951 is not accurate due to an unsuitable tallying method, but all other tallies are direct counts of ripened berries. Berries are not borne on one year old limbs and therefore treated plots do not bear till the second year. Plots 3, 6, 7 and 9 were burned between the 1951 and 1952 seasons.

The significance of differences between treated plots and their controls is shown by asterisks. No asterisks (a dash) indicate that the plot differs from its control by an amount that has little or no significance. One asterisk indicates the difference could have occurred by chance one time in twenty, or less. Two asterisks indicate the difference could have occurred by chance one time in a hundred, or less. Three asterisks indicate the difference could have occurred by chance one time in a thousand, or less. The presence of asterisks indicates in various degrees the assumption that the difference is caused by a true influence and not by mere chance. The tests of significance were made by Student's "t" method.

TABLE I

Average Number of Ripe Berries Per Quadrat

Layout No. 1			Layout No. 2			Layout No. 3		
Plot 1 (Spring Burn)	Plot 2 Control	Plot 3 (Fall Burn)	Plot 4 (Spring Burn)	Plot 5 Control	Plot 6 (Fall Burn)	Plot 7 (Fall Burn)	Plot 8 Control	Plot 9 (Spring Burn)
0.00 * **	2.25		0.00 * **	0.60				
1.12 * **	4.94	0.76 * **	0.76 —	0.54	0.08 *	0.00 —	2.34	0.00 —
0.04 —	0.04	0.08 —	0.12 —	0.00	0.02 —	0.10 —	0.00	0.04 —
3.00 —	2.80	9.66 * **	5.66 * **	0.40	2.34 * *	6.12 * **	1.78	2.94 —
1.16 —	1.92	3.06 —	0.06 —	0.00	0.08 —	0.14 —	0.04	0.22 —

1952 and 1955 show effects of drought. In 1953 a June frost reduced all plots to a no-crop level, or nearly so. 1954 is a good crop year and the table shows strong treatment effects still in evidence in the third and fourth growing seasons.

The four main conclusions given previously were derived from table 1.

Interest centres on the 1954 crop since it is the only one significantly larger than its controls. The treated plots offer the following yields for 1954:

TABLE 2

Treated Plot No.	Average No. of Berries Per Quadrat	Surplus Over Control Plot
1	3.00	nil (difference not significant)
3	9.66	6.86
4	5.66	5.26
6	2.34	1.94
7	6.12	4.34
9	2.94	nil (difference not significant
Average Per Quadrat	4.95	3.07

Table 2 shows that the treated plots yielded an average of 4.95 berries per quadrat of which 3.07 were present because of treatment three and four years previously. A normal crop would have been 1.88, and the crop was therefore increased to about two and a half times the normal. An average of 4.95 per quadrat represents over 200,000 berries per acre.

It is not proper to compare crops on different areas since they may be at different stages of ripening. At any one time a tally will miss berries that have already fallen, or berries that are still green but may ripen later. However, the information derived from table 2 is useful as an indication of proportion. It should not be used as a hard and fast figure.

The tallyman in 1955 described the crop as not being a bumper one, and recorded that plots 7, 8 and 9 had been harvested before tallying. These points can be kept in mind in examining table 1.

SPECIAL ASPECTS

Weather

In 1952 plots 3, 6, 7 and 9 were in their first year after burning and no crop was expected. The 1952 figures for these plots in table 1 bear out this expectation. Therefore plots 1 and 4 are the only plots on which an increase could be expected. Neither plot is significantly greater than its control and drought is assumed to be the cause, although it has not been proven that a larger crop can result in the second season after treatment.

The 1955 crops were uniformly indistinguishable from their controls and this condition is attributed to drought. It should be noted that the experiment was not set up to test the effects of drought. Even though the effects are reasonably plain in table 1 they are still not subjected to the rigour of significance tests.

A June frost in 1953 killed nearly every blueberry flower and resulted in a crop failure. This frost extended from the height of land west of Port Arthur to Schreiber about one hundred miles east of Port Arthur. The overnight destruction of the flowers was observed by many persons. Even though the experiment was not set up to test the effects of frost, these effects are nevertheless firmly established by the circumstances. A late frost occurring after the berries were formed was not recorded. If such a frost occurred its effects may have been mistaken for those of drought.

Fall Burning Versus Spring Burning

The experiment was set up to distinguish between these variations of treatment. An attempt was made to burn one plot in each of the first two layouts in the Fall of 1950, but the ground was too wet and no burning was done that year. Burning was carried out in these two layouts in the Spring of 1951 and again in the Fall of 1951. This procedure permitted a growing season to occur between the Spring and Fall burns and so rendered them not comparable throughout the experiment. This leaves plots 7 and 9 as a basis to decide between Fall and Spring burns.

TABLE 3

Comparison of Fall and Spring Burns
(Average Number of Berries Per Quadrat)

Year	Plot 7 Fall Burn	Plot 9 Spring Burn	Significance of Difference
1952	0.00	0.00	nil
1953	0.10	0.04	nil
1954	6.12	2.94	**
1955	0.14	0.22	nil

This single instance is too small a basis to allow a conclusion. The table indicates that when weather does not override the treatment effects Fall burns produce the larger crop. Some doubt is thrown on this possibility by a similar comparison based on the average percentage of blueberry foliage per quadrat (estimated by eye).

TABLE 4

Comparison of Fall and Spring Burns
(Average Percentage of Blueberry Foliage Per Quadrat)

Year	Plot 7 Fall Burn	Plot 9 Spring Burn	Significance of Difference
1952	11.82	12.16	nil
1953	16.98	16.00	nil
1954	21.08	22.12	nil
1955	22.80	27.60	nil

The re-establishment of blueberry foliage on the two plots followed similar paths. It is difficult to understand why one set of foliage should bear fruit differently from the other.

More proof is needed.

Severity of Burning

The experiment was not set up to distinguish this feature. Plot one was more severely burned than plot three, and plot four was more severely burned than plot six. The crops in 1954 bear opposite relationships as seen in table 1. Confusion is introduced since the comparisons between severe and light burnings coincide with Spring and Fall burnings, with the further feature that a growing season intervenes between the two sides of each comparison as explained under "Fall versus Spring Burning". The lesson to be learned is that all features on which information is required should be separately compared in subsequent experiments.

Site

In carrying out the experiment it was noted that the water table was close to the surface in layout number two, and was very deep in layout number one. It was hoped that this difference in moisture conditions would be reflected in the crop data. Table 1 does not bear out this hope and no conclusions can be drawn.

Plot one was on the brow of a hill. Some reflection of this may show in tables one and five.

Blueberry Foliage

The percentage of the area of each quadrat taken up by blueberry foliage was tallied at the same time as the number of ripe berries. The important factor is crop, but it was thought that foliage data might help explain difficult points. Foliage data is given in table 5, with the same use of asterisks as in table 1 to define significance of differences. It will be left to the reader to compare foliage and crop data. It will be seen that foliage tends to return to the state of the control in the first or second year, and does not fluctuate from the control plot as readily as crop.

TABLE 5

Average Percentage of Blueberry Foliage Per Quadrat

Layout No. 1			Layout No. 2			Layout No. 3		
Plot 1 (Spring Burn	Plot 2 Control	Plot 3 (Fall Burn	Plot 4 (Spring Burn)	Plot 5 Control	Plot 6 (Fall Burn)	Plot 7 (Fall Burn)	Plot 8 Control	Plot 9 (Spring Burn)
3.16 ***	15.24		13.18 *	18.80				
4.32 ***	13.80	13.08 —	16.50 — almost *	21.56	19.80 —	11.82 **	17.42	12.16 *
5.36 ***	17.47	17.48 —	17.52 ***	28.26	27.28 —	16.98 —	17.78	16.00 —
8.54 ***	23.16	32.66 *	20.60 ***	35.50	33.32 —	21.08 —	21.54	22.12 —
8.80 ***	23.10	25.80 —	15.80 ***	29.70	30.70 —	22.80 —	21.10	27.60 —

EVALUATION OF THE EXPERIMENT

The experiment accomplished its purpose of determining the place of controlled burning in blueberry management as a Forest Protection measure. The findings apply to open sand plains in Port Arthur District. It is reasonable to expect the same results on similar areas in other parts of Ontario where similar climate prevails, but this is a matter for individual acceptance. Ottawa Government weather records should help in deciding whether or not to accept the findings of the experiment in any particular locality.

Reports are sometimes heard of successful blueberry management on a three year rotation. These reports usually concern the east coast of Canada or the U.S.A., or Newfoundland. It appears that a maritime climate may be the secret of successful blueberry management.

It does not follow that the findings apply on hilly thin-soiled sites, or swampy sites, where drought and frost conditions may be different.

The experiment has brought out some of the factors to be taken into account by anyone who wishes to investigate the opportunities for blueberry management in his own locality. In this connection an improved design is given in the section on statistical background at the end of this report.

Although the experiment indicates a restricted sphere for blueberry management, it has helped define a technique that is useful in tracing changes in plant succession after forest disturbances, and allied studies in regeneration and seeding.

Carrying out a simple experiment of this type gives a field worker a closer feeling of local ecological factors than he would get in everyday woods work.

STATISTICAL BACKGROUND

The use of controls is a well known procedure. They provide a basis for comparison. Without a control an experiment would show the effects of a treatment but not whether they were greater or less than normal. Controls operate by going through all the influences that the subjects do, except the treatment under study. In the present experiment Student's "t" test was used to show the probability of mere chance accounting for the differences from controls. These probabilities satisfy most minds that a true influence is at work and not a chance variation.

A fundamental requirement in the experiment was the matching of trial plots with their controls before treatment. This was accomplished by tallying all plots before treatment and using the "t" test to see that trial plots did not differ significantly from their controls. Layout number one was tallied on October 26, 1950 and layout number two on November 2, 1950, too late in each case to measure the berry crop. The features tallied to test homogeneity were

1). Per centage of blueberry foliage on each quadrat.
2). Per centage of grass on each quadrat.
3). Per centage of non-productive area on each quadrat.

Non-productive area included collections of bits of rotten wood or punk, a matt up to 3/4 of an inch deep made of dead Polytrichum moss roots, bare sand, living clumps of Polytrichum moss (future matt) and living lichen matt.

Table 6 shows the results of the tests before treatment.

TABLE 6

Tests For Homogeneity, Before Treatment, 1950

	Layout No. One			Layout No. Two		
	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6
Blueberry Foliage	8.56 *(just)	16.56	23.22	25.04	28.57	26.02
Grass	3.28	3.14	0.62 (almost*)	10.20	12.80	13.84
Non-Productive Area	81.80	76.60	71.40	61.84	53.71	56.67

Plots 3, 4 and 6 are adequately controlled. Plot 1 is not well controlled.

Plots 7, 8 and 9 were similarly tested, but in more detail (September 13 & 14, 1951).

TABLE 7

Tests For Homogeneity, Before Treatment, 1951

	Layout No. 3		
	Plot 7	Plot 8	Plot 9
Blueberry Foliage	16.64	18.04	14.26
Dwarf Cornel	3.82	3.34	4.14
Grass	0.28	0.96	2.30
Matt	14.16	15.44	19.54
Sand	1.34	1.48	3.04
Wood and Punk	49.48	51.62	45.02
Polytrichum Moss	6.66	3.98	4.58
Blueberry Crop	0.80	0.66	0.56

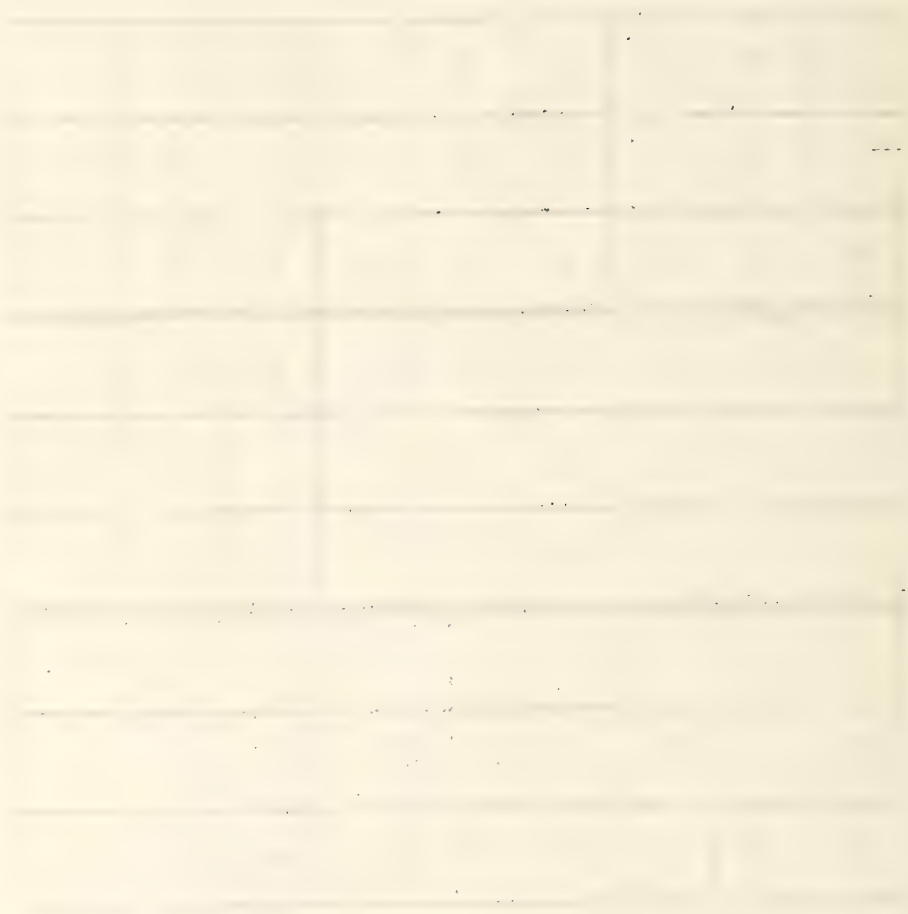
Plots 7 and 9 are well controlled.

The suitability of the technique for tracing changes in ground cover after a disturbance is evident from tables 6 and 7.

If further studies of blueberry crops are found desirable an experiment of more compact design and greater accuracy can be secured by using Latin squares and analysis of

variance. An experiment using variations of the following design allows two treatments and retains 54 degrees of freedom to determine experimental error after allowing for the effects of rows, columns and blocks. Similar designs can be made to include more treatments. Tally should be taken before treatment, and the treatment (A, B or C) with its average value lying between the other two should be chosen for control. Each quadrat would be located at the centre of its square, several feet apart, and treatments should extend beyond the edges of the quadrats.

A	B	C	A	B	C	C	A	B
C	A	B	B	C	A	A	B	C
B	C	A	C	A	B	B	C	A
A	C	B	C	B	A	B	A	C
C	B	A	B	A	C	A	C	B
B	A	C	A	C	B	C	B	A
B	C	A	A	C	B	C	A	B
C	A	B	B	A	C	B	C	A
A	B	C	C	B	A	A	B	C



REPORT ON FIELD TRIP TO MARSH DEVELOPMENT AREAS IN NORTHERN NEW YORK STATE NOVEMBER 21-23, 1955.

by
H. R. McCrimmon

The field trip was made possible through the courtesy of Dr. Senning, New York State Conservation Department, and the excellent services provided by members of his field staff.

The Ontario group were all members of the Lake Simcoe District staff and included H. R. McCrimmon, Biologist; J. S. Dorland, Wildlife Management Officer; and Conservation Officers G. Armitage, B. Smith and N. Sitwell. Transportation was provided by a Departmental "ranch waggon."

The itinerary was as follows:

Mon., Nov. 21st: 7:00 A.M. - left Maple
2:00 P.M. - arrived at Watertown
John Wilson (District Game Manager)
Guides were Elmer Wagner, Assistant Game Manager and Mr. Roland Parker. Balance of day spent in viewing the smaller marsh development projects in the Perch lake area, the wildlife station at Perch Lake, and the large Perch River marsh development.
Night at Watertown.

Tues., Nov. 22nd: A.M. - the party was guided by Mr. Wagner and Mr. Parker through small marsh development areas to the south of Watertown and in the foothills of the Adirondacks.
1:30 P.M. - the party was met at Sodus by the local Management Officer, Mr. Cottrel who conducted a tour of a number of small marsh developments within a radius of 10 or 15 miles of Sodus.
Night at Rochester.

Wed., Nov. 23rd: A.M. Party assembled at District Conservation Office in Rochester (Mr. Robt. Perry, Game Manager). The tour was conducted by Mr. Denton Aldrow, Assistant Game Manager, who showed us various small marsh developments between Rochester and Niagara Falls. Considerable time was spent at the large

Oak Orchard Marsh development.
6:00 P.M. - Party arrived at Niagara Falls.
9:00 P.M. - Party arrived at Maple.

For the information of other groups contemplating a field trip of this nature, the total cost of the trip for 5 men for 3 days, including transportation, was under $125.00.

Small Marsh Development

Purpose: (1) to provide breeding areas for duck (largely black, mallard, teal).
(2) to provide sanctuary for resident and migratory birds.

Administrative procedure:
(1) Location, design and construction of impoundment approved by Government engineers as initial step.
(2) The site leased from the landowner for a period of years under the plan that the cost of construction would be amortized at a given rate. In actuality, there is no cost to the property owner, However, if the owner desires a more elaborate pond for fire protection or other purposes, he must pay any additional costs entailed.
(3) The developed marsh is posted officially against hunting and trespassing until such time, usually 20-25 years, as all rights to the land revert back to the owner.

Characteristics of small marshes:
The development of small marshes is being undertaken in areas where natural marshes are scarce or absent. The procedure is basically to locate low areas in watershed headwaters (where the water supply may be a small stream, spring or run-off) which can be flooded by the construction of a simple earth fill dam. Each dam is constructed in accordance with engineering standards with either a cement spillway or, more commonly, a chimney-type outlet. In all cases ample auxilliary spillways are provided to handle maximum flood conditions.

The pond is usually flooded only to a depth of 1½ or 2 feet and may inundate from a fraction to several acres of land. Apparently no effort is made to clear the vegetation or trees on the flooded areas. While it is usually grass covered or scrub land which is flooded, we were shown several

examples where plots of young deciduous trees had been flooded and, no doubt, will eventually die out. Little attempt is being made at present to seed or plant the newly constructed marshes with aquatics or marginal vegetation. However, several marshes in the Adirondack area were constructed in coniferous reforestation. Wood duck houses were set up in many of the marshes and apparently with reasonably good success.

In view of the general characteristics of the marshes developed, particularly their extreme shallowness, they are generally unsuited for fish populations although there was an odd marsh in the Sodus area with water deep enough to support largemouth bass and panfish. The men charged with the marsh development programme peculiarly showed no apparent interest in the increased fur production which resulted from their work and were unprepared to answer the questions of our officers concerning fur production and related economics of the marshes.

In general, the management men considered the development of a small marsh to be successful if it produced one or two broods of duck annually. Most of the small marshes are too minute to attract migratory birds and, I would think, to provide any degree of duck hunting. Although hunting is prohibited in the small marsh developments, used shotgun shells on the ground were evidence that enforcement was a difficult matter.

Large Marsh Development

We were shown two excellent examples of large marsh reclamation or development. These were the Perch River Development near Watertown and the Oak Orchard management area near Batavia. Of particular interest in these marshes was (1) public ownership of the property, and (2) a combination of public hunting areas and sanctuaries, each clearly posted with appropriate state signs.

Perch River: An extensive marsh restoration programme is underway on the Perch River where a long earth fill dam has effectively flooded an area estimated at perhaps a hundred acres or more. It would appear that the area

flooded was scrub-marsh land periodically flooded each year. It is now maintained at a relatively constant water level, varying from a few inches to several feet in depth from place to place. Although only recently built, the marsh is obviously able to support a considerable breeding population of duck and marsh birds, attract birds in migration, and provide at least a substantial shoot for resident birds. A considerable muskrat population is also developing.

As a part of this marsh restoration programme, a number of small dug-out ponds, averaging perhaps 1/10 acre in size, have been constructed within a few hundred yards of the marsh with the hope that they will serve as breeding areas for one or more pair of duck. This aspect of the project would seem reasonably satisfactory. Also, attempts have been made to improve nesting conditions in the large marsh and the potholes by pushing up mounds of earth and vegetation. I was not thoroughly convinced of the value of this operation.

The division of the Marsh into a public hunting area and a sanctuary area would appear to work satisfactorily. Management there, as in Southern Ontario, is confronted with tremendous hunting pressure on local marshes on open day. Closed areas are undoubtedly, a sound conservation measure.

It should be noted that in close proximity to the marsh restoration area is Perch lake, a small lake which has been acquired by the State Conservation Department as a research management station. Also, in the area are a number of small marsh developments on private lands as outlined previously.

Oak Orchard Management Unit:

This is an extensive marsh development, restoration and utilization project embracing both public hunting areas and refuge areas. It is several hundred acres in extent and located on publicly acquired lands.

A considerable part of the marsh was already a good artificial waterfowl area when acquired from private interests. The balance has been impounded since acquisition. In addition to the large marshes, a number of small dug-out ponds have been constructed nearby to serve

as additional breeding areas. Public hunting areas are heavily shot particularly on opening day and restrictions on hunting pressure are being seriously considered.

The marsh is sufficiently large to attract flocks of migratory ducks and geese and even in late November we observed several thousand northern ducks in one part of the marsh. There are several other quite large impounded waters close-by which are partly publicly and partly privately owned. These also provide the dual purpose of providing public hunting and sanctuary to resident and migratory waterfowl.

General Remarks:

In order that the marsh development programme may be appraised as fairly as possible, each of the officers in the party has been requested to submit his personal observations on some phase of the waterfowl management work in Northern New York State.

Concerning the general management of fish and wildlife resources in New York State in comparison to that in Ontario, I noted that the Officers were amazed at the lack of integration of fisheries management, wildlife management and law enforcement. This was particularly evident at the field level where, for example, those concerned with marsh development for waterfowl showed little interest even in the muskrat production of the marshes:- a point which our officers considered to be of biological as well as economic significance. It is of interest that the best general picture of game populations and general hunting conditions came from conversations with enforcement officers. I feel that the soundness of our integrated fish and wildlife management programme in Ontario was clearly demonstrated to the group.

INCREASED WHITEFISH PRODUCTION THROUGH COMMERCIAL FISHING DURING THE WHITEFISH SPAWNING PERIOD IN FOUR WATERS OF THE KENORA DISTRICT.

by
J. N. Fraser

Introduction

In the Kenora District we are confronted with the problem of managing our lakes primarily for sport fish but at the same time maintaining sufficient commercial fishing to offset the effects of the increased selection of sport fish by angling. We also wish to harvest commercially valuable fish crops in a manner which is complementary to angling as regards the economy of the lake.

In certain of our lakes we have sizeable whitefish populations which have either not been harvested or have been underharvested. Commercial fisheries, limited as to the amount of sport fish they can take, have been set up in some of these lakes but it was felt that their catch of non-sport fish has been held down by the restrictions imposed on them in respect to the sport fish. To improve this situation it was decided to exploit the whitefish population when it was concentrated on the spawning grounds. It was felt that increased catches of whitefish and reduced catches of sport fish would result.

Crow Lake, Dogtooth Lake, Thunder Lake and Whitefish Bay (Lake of the Woods) in the Kenora District all contain abundant whitefish populations and permission was received to waive the closed whitefish season (Oct. 25 - Nov. 15) in these waters on an experimental basis for the 1955 season only. The following table lists the catches made during the spawning season in these four waters and a brief account of each lake and its fishery follows:

Catch in Pounds

Lake	Whitefish	Lake Trout	Pickerel	Pike	Suckers	Ling
Crow L.	10,190	207	-	105	547	49
Dogtooth L.	9,131	-	80	76	3,970	-
Thunder L.	2,620	45	370	220	295	290
Whitefish B.	5,497	-	-	-	313	216
TOTALS	27,438	252	450	401	5,125	555

Crow Lake

This lake covers an area of 38 square miles and averages 75 feet in depth. It is located six miles north of Nestor Falls and lies along the east side of Highway No. 70. Whitefish and lake trout are the most abundant species of fish and the smallmouth bass, maskinonge, pike, ling and sucker are common in Crow Lake.

The sport fishery is mainly for lake trout and confined to the spring and fall periods when the lake trout are in shallow water. For its size Crow Lake receives little angling during the summer months. The guests of seven commercial camps located on Crow Lake and twelve located at Nestor Falls try Crow Lake for lake trout "in season."

In response to local requests and after a preliminary survey of Crow Lake a management fishery (gill nets) was established in December, 1954 with the purpose of reducing the non-sport species, mainly the whitefish. An annual quota of 4000 pounds was calculated to give the lake trout ample protection.

During the period Jan. - Sept., 1955 the commercial fishery removed 29,420 pounds of whitefish (25 pounds per 100 yards of 4 1/2 inch mesh net) and 3,865 pounds of lake trout at a ratio of 7.6 pounds of whitefish to 1 pound of trout. During the whitefish spawning season 10,190 pounds of whitefish (51 pounds per 100 yards) and only 207 pounds of lake trout were taken. The poundage ratio of whitefish to trout during this period was 48:1.

The extension of the Crow Lake fishery to include the whitefish spawning period appears to have worked out successfully. An additional 10,000 pounds of whitefish were removed twice as efficiently as in previous operations while the catch of lake trout was negligible.

Dogtooth Lake

Dogtooth Lake is located 15 miles east of Kenora. It is very irregular in outline, consisting of a number of long narrow arms. This lake is 10 square miles in area and its average depth is about 30 feet. The pickerel and smallmouth bass are introduced species and provide good angling for the guests of three commercial camps, some twenty private camps and local residents and campers. Lake trout and pike are also taken by angling but their populations appear to be small.

An overabundance of whitefish in Dogtooth Lake has been noticeable in the past few years and requests by anglers and camp owners led to the establishment in February, 1955 of a limited winter fishery. To bring additional pressure to bear on this whitefish population netting was permitted during their spawning period. During this period 9,131 pounds of whitefish were caught at a rate of 45 pounds per 100 yards of 4 1/2 inch mesh. This brought the 1955 catch of whitefish from Dogtooth lake to 31,886 pounds with a catch per unit effort of 29 pounds per 100 yards for the year and a production of five pounds per acre. The catch of sport fish has been very small during the entire operation of this fishery.

Thunder Lake

This is a small lake located on the north side of Highway #17, eight miles east of Dryden. It has an area of 4 square miles and its average depth is 40 feet. Thunder Lake contains lake trout, pike, pickerel, and smallmouth bass and these species receive a moderate amount of fishing from the local residents and about twenty-five cottage owners located on the lake.

A biological survey conducted in 1955 showed a sizeable whitefish population and a gill net licence was issued for the whitefish spawning period only. Gill nets were fished during the period November 1-8 and were then removed owing to the difficult fishing conditions. In eight days of fishing 2,620 pounds of whitefish were caught at a rate of 39 pounds per 100 yards of net. 370 pounds of pickerel were taken but 200 pounds of this catch were taken in several nets which were set in deeper water. The shallow nets caught few pickerel.

This small operation was successful in removing one pound of whitefish per acre from Thunder Lake with very little effort. In future years an increased production can easily be realized by using additional nets.

Whitefish Bay

Whitefish Bay is the east portion of Lake of the Woods and covers an area of approximately 100 square miles. Its average depth is about 45 feet and in certain locations depths of over 150 feet have been found. There is a heavy concentration of commercial tourist camps and private camps located on Whitefish Bay and although gill netting is permitted in adjacent portions of Lake of the Woods this bay has been closed to this type of fishery since 1936.

In relation to other waters of the district Whitefish Bay is one of the more heavily angled waters and although angling is reported to have deteriorated somewhat it is still

considered good angling water. Pickerel, pike and lake trout make up the bulk of the anglers' catch along with smallmouth bass, black crappie and maskinonge.

In August, 1954 a pound net fishery was established in Whitefish Bay with the purpose of removing a portion of the valuable whitefish crop and any coarse fish that could be taken. Under conditions of this licence, all sport fish are released from the pound nets alive.

It was felt that the whitefish in Whitefish Bay were vastly underharvested and permission was given to the pound net fishery to continue operations during the whitefish closed season. Preliminary tagging studies had indicated little migration of whitefish to other parts of Lake of the Woods where the closed season was in force.

An additional 5,497 pounds of whitefish were caught by six pound nets during the spawning period to bring the annual catch to 26,430 pounds. This is not a high production in view of the water area of Whitefish Bay but it is pointed out that this pound net fishery is in its first year of operation. Pound nets had not been previously operated in these waters and when the fishermen have had an opportunity to try more net locations a more productive fishery will probably result.

Summary

Commercial fishing during the whitefish closed season was permitted on an experimental basis in Crow Lake, Dogtooth Lake, Thunder Lake and Whitefish Bay (Lake of the Woods) of the Kenora District. All of these waters contain sizeable whitefish populations and the general attitude to reduction of this species by means of commercial gear was a favourable one. These waters also contain Lake Trout populations of varying size and importance. Each of these waters (except Thunder Lake) supports a limited commercial fishery and these fisheries were permitted to operate during the whitefish spawning period. A commerical fisherman from a nearby lake was permitted to operate in Thunder Lake for the spawning period only.

A total of 27,438 pounds of whitefish was taken from these four waters during the spawning period while the total catch of sport fish (pickerel, pike, lake trout) amounted to 1103 pounds. In addition 5,680 pounds of coarse fish were removed from these waters. The catch-per-unit-effort in the gill netted lakes ranged from 39 to 51 pounds of whitefish per 100 yards of 4 1/2" mesh gill net. As expected the catch of whitefish per net during the spawning period was considerably higher (almost double) than that

experienced during other seasons of the year. Increased whitefish catches began about October 29th and tapered off after November 14th.

The commercial fishermen operating in these waters experienced some difficulty in fishing the shoal areas owing to the high winds and cold weather. They were also hampered somewhat by lack of knowledge of their grounds as all these fisheries have been operating only a short time. The fishermen felt that with increased knowledge of their grounds and spawning areas they can increase their catches appreciably.

Whitefish prices were high during this period and the fishermen received $10,000 for the combined catch of 27,438 pounds of whitefish.

Discussion and Conclusion

The purpose that the closed whitefish season serves even in heavily fished waters has never been too clear and in fact there is some evidence that this measure is not necessary. Theoretically its purpose is to prohibit exploitation at a time when the fish are concentrated and vulnerable and in so doing ensure an adequate number of spawners for the reproduction of future year classes. However, various investigators have concluded that weather and temperature conditions and not the number of spawners is the limiting factor in respect to the size of whitefish year classes. It has been noted that some of the strongest year classes of whitefish have originated when the number of spawners was at a minimum.

At the present time although there is no closed season for whitefish on the Great Lakes there is a closed season on the inland lakes and for the territorial districts of Kenora and Rainy River this season extends from October 25th to November 15th inclusive.

There appears to be no need for this regulation in the "restricted fisheries lakes" of the Kenora District and it is highly doubtful if it serves a useful purpose in Lake of the Woods. These smaller lakes are underharvested in respect to whitefish and even with the increased catches taken during the spawning period these lakes can hardly be considered to be cropped.

The results of fishing during the spawning period in the four test waters show that considerable quantities of whitefish can be removed with the sport fish catch being held to a minimum. This is considered good management in that the whitefish crop is more fully harvested and as a result the small fisheries become more stable financially and better able to carry out their operations at other times of the year when the coarse species of fish can be taken.

It is suggested that the whitefish closed season is superfluous for these lakes at the present time and it is recommended that commercial fishing be permitted during the whitefish spawning period. If the danger of depletion ever becomes evident in any of these lakes a quota can be used to relieve the situation.

BASS LAKE FISHERY SURVEY, 1955

by
H. R. McCrimmon

Introduction

A fisheries survey of Bass Lake, situated in the Townships of Orillia and Oro, County of Simcoe, was carried out during the summer and autumn of 1955. Biological studies were done with the assistance of Conservation Officers of the Lake Simcoe District. Netting operations were handled by the staff of the Provincial Fish Hatchery, Collingwood. The creel census made in August and early September was an undertaking of the Orillia Fish and Game Protective Association.

Description of Bass Lake

Bass Lake has an area of approximately 3.1 square miles. It is a shallow lake with 90% of its area under 20 feet in depth as shown in the following table:

Depth in Feet	Percentage of Lake
0-5	29%
5-10	30%
10-15	20%
15-20	11%
20-25	6%
25-30	3%
over 30	1%

A greater portion of the lake is rimmed by a hard sand shallow beach. While the south shore is characterized by a stony shoreline, these stones extend into the water only infrequently and are then imbedded in the sand bottom. Although most of the lake is shallow with a hard bottom, the local areas of deeper water have a soft or oozy bottom.

On account of the hard bottom occurring over the littoral part of the lake, aquatic vegetation is sparse and limited essentially to thin beds of quill weed in the shallow westerly portion of the lake. The margins of the lake are generally wooded to the water's edge. The lake may be considered relatively unproductive in comparison to other lakes of similar size in the region.

Numerous springs and several spring-fed creeks are present along the southwesterly shore of the lake and provide a considerable amount of cool water which, however, has only a very local effect on the summer water temperature of the lake. Two of these streams, entering the lake in Concessions XIII and XIV of Oro Township are suitable trout waters over their entire lengths of about two miles each.

Bass Lake drains through a shallow opening on the north shore into the North River which at the point of exit from the lake has a minimum summer flow as low as 10 C.F.S. and maximum temperatures exceeding 80°F. The North River flows some 15 miles into Waubaushene Bay of the Georgian Bay.

Bass Lake is a warm water lake in which summer thermal stratification is generally lacking. Temperatures of 70-80°F characterized the area of deep water during much of the summer of 1955. Simultaneously, the temperature of the shallow water areas approximated maximum area temperatures. The location of springs and small feeder streams along the southwesterly shore of the lake had a very local cooling effect only on the summer water temperature of the immediate area.

Netting Operations

Three six-foot trap nets were operated on the lake between August 22nd and 27th. The nets were moved daily in order to sample the lake as widely as possible. All fish captured were returned to the water. The catch records are as follows:

Species	Number of Fish Captured					
	Aug. 23	Aug. 24	Aug. 25	Aug. 26	Aug. 27	Total
Sunfish	288	434	381	247	192	1542
Rock Bass	37	34	77	63	34	245
Brown Bullheads	11	13	9	22	14	69
Common Suckers	6	7	22	9	4	48
Smallmouth Bass	6	12	17	16	8	59
Total	348	500	506	357	252	1963

Creel Census

A Creel Census was carried out on the weekends of August 20-21st, August 27-28th and September 3rd, 4th, and 5th. A summary of the reports is as follows which

covers 79 fishermen (36 boats) fishing for 112½ hours:

Hours of Fishing	Number of Smallmouth Bass		Number of Panfish
	Released	Retained	Retained
112.5	27 (8-11")	68 (11-18½")	203

From the data collected it is shown that:

(1) 72% of the fish captured were legal and retained by the anglers.

(2) Fishing success for smallmouth bass was 0.6 fish per hour of fishing.

(3) Some 56% of the fishing parties were successful.

(4) Some 50% of the anglers kept panfish for food.

(5) Most fishermen reported the quality of smallmouth bass fishing to be excellent.

Fishes of the Lake

The smallmouth bass (Micropterus dolomieui)

Smallmouth bass are the game fish of Bass Lake and are apparently native to the waters. Native stocks have been supplemented by plantings of hatchery fish as follows:

Plantings of Smallmouth Bass

Year	Age	Nos.	Year	Age	Nos.
1946	fingerlings	500	1952	fingerlings	400
1948	fingerlings	750	1953	fry-fing.	20000
1950	fingerlings	1000	1954	fry-fing.	10000
1951	fingerlings	1000	1955	fingerlings	1500

Growth studies were made on 89 smallmouth bass taken during September netting operations. The data are summarized as follows:

Age Group	Number of Fish	Average Total Length	Average Weight
II	35	9.2" (7.0-10.0)	7.3 oz. (4.0-12.0)
III	42	12.3" (11.0-13.5)	15.0 oz. (8.0-28.0)
IV	7	14.3" (14.0-15.2)	32.0 oz. (24.0-36.0)
VI	5	15.8" (15.0-16.0)	28.0 oz. (24.0-36.0)
VII	3	16.3" (16.0-16.5)	38.6 oz. (32.0-48.0)
IX	1	18.5" -	64.0 oz. -

The Sunfish (Lepomis gibbosus)

The sunfish is the most abundant fish of Bass Lake where it is considered a sport fish by a percentage of the fishermen.

A summary of growth studies follows:

Age Group	Number of Fish	Average Total Length
IV	1	3.0"
V	22	4.2" (4.0-6.0)
VI	79	5.8" (5.0-6.5)
VII	1	7.0"

The Rock Bass (Ambloplites rupestris)

The rock bass is a common but not abundant species of Bass Lake which forms but a small part of the sport fishery. The growth data for these fish are summarized as follows:

Age Group	Number of Fish	Average Total Length
III	44	5.3" (3.5-6.0)
IV	37	6.3" (4.0-7.0)
V	7	7.1" (7.0-8.0)
VI	16	7.5" (6.5-8.0)
VII	13	8.1" (8.0-9.0)
VIII	2	9.1" (8.7-9.5)

The Common Sucker (Catostomus commersonii)

There is a modest population of common sucker in Bass Lake which do not contribute directly to the sport fishery. Growth data are summarized in the following table:

Age Group	No. of Fish	Average Total Length	Average Weight
III	3	12.0" (11.0-13.0)	9.3 oz. (8.0-12.0)
IV	8	13.7" (12.0-14.5)	10.9 oz. (8.0-16.0)
V	13	15.5" (15.0-16.0)	15.3 oz. (8.0-16.0)
VI	1	17.5" -	28.0 oz. -
VII	2	19.5" (19.0-20.0)	42.0 oz. (40.0-44.0)

The Yellow Perch (Perca flavescens)

The yellow perch constitutes a low percentage of fish population in Bass Lake and forms a minor part of the sport fishery. Growth data for 3 perch taken in the lake are as follows:

Age	Total Length
3	6.0"
4	7.0"
5	7.0"

The Brown Bullhead (Ameiurus nebulosus)

There is a nominal population of brown bullheads in Bass Lake which contributes little to the sport fishery. Most of this species examined were small, averaging 5 to 7 ounces. A study of growth rates was not made.

Minnows

The population of minnows in Bass Lake is restricted essentially to a relatively low quantity of warm-water dace and shiners which contribute moderately to the food of the smallmouth bass.

Speckled Trout (Salvelinus fontinalis)

Although a warm water lake, small numbers of speckled trout are resident in Bass Lake during the cold water seasons. A few trout are present from time to time adjacent to the mouths of the trout streams at the west end of the lake even during the summer months. However, speckled trout cannot be considered to be a sport fish of Bass Lake in view of their infrequency in the lake while those small spring streams at the west end of the lake do provide average speckled trout fishing.

Those trout appearing in the lake exhibit the slow growth rate characteristic of local stream trout.

Management

Bass Lake has a physical character which does not favour a high biological productivity. Consequently, maximum production can be expected to result in only a moderate harvest of sport fish.

Smallmouth bass, apparently native to the lake, is the most suitable species of sport fish for the habitat conditions present. At the present rate of exploitation, the smallmouth bass population appears to be adequately harvested with no evidence of serious over-fishing as shown by the normal growth rate of this species (fish 11-18" appearing regularly in anglers' catches) and the fair quality of fishing occurring over a period of years.

Although there is evidence that the population of panfish (sunfish and rockbass) is above the desired level in proportion to the numbers of smallmouth bass present, the problem is not a serious one. Coarse fish are not in abundance and their presence is not generally apparent to the angler although some suckers are taken by fishermen during spring spawning runs.

While the value of the smallmouth bass restocking programme of recent years is not clear, fair to good fishing has prevailed over these years which suggests that the stocking is not unwise. In view of the scarcity of spawning areas and the modest population and normal growth rates of the smallmouth bass, the present restocking policy of planting fry and fingerling smallmouth bass should be continued. No further introduction would seem desirable or necessary.

As long as the smallmouth bass population remains normal and Bass Lake continues to satisfy the demands for recreational fishing, it is doubtful that changes in the management policy would benefit the fishery appreciably.

Recommendations

It is recommended that:

(1) There should be no appreciable change in the fisheries management policy for the lake. Liberalized angling in the form of an abolishment of size limits would conceivably increase the harvest of smallmouth bass but would be of little significance in the management of the fishery.

(2) The policy of annual plantings of hatchery-raised smallmouth bass should be continued at the rate of approximately 1000 fingerlings.

(3) Anglers should be encouraged to harvest as many panfish and coarse fish as possible. No fish of these species which are taken by fishermen should be returned to the water.

(4) There should be periodic studies, possibly every 3 or 5 years, in order to ascertain any significant changes in the fishery which would affect the recreational value of Bass Lake.